BROOKHAVEN NATIONAL LABORATORY

RHIC Project

M E M O R A N D U M

DATE: August 8, 1995

TO: J. Rose

FROM: S. Musolino SM

SUBJECT: Measurements of Prompt Radiation from the Storage RF Cavity Test in 4 o'clock Service Building

Measurements at steady state high power were made on June 27, 1995 to confirm the source term used to design shielding and interlock protection for the test enclosure. During the measurements, the cavity gap voltage was held at 1.1 MV, 100% duty factor corresponding to 55 kW of dissipated power. Direct measurements at the cavity were made with a Chipmunk by integrating the digital output with a multichannel scaler.

The Chipmunk output was determined to produce approximately 1200 counts/4.18 seconds at nine feet from the cavity, with the quality factor set to one. The raw data converts to 2.5 rad/hr. Since actual source geometry was not determinable, it is appropriate to express a range of dose rate at one foot. If a geometry between a $1/r$ and a $1/r^2$ is assumed, then the cavity will produce 25-202 rad/hr at one foot. Even though the geometry is not a point source, the worst case extrapolation complies with the Class II area that has been configured for operation.

Measurements of scattered radiation propagating to the entrance of the labyrinth were made using a Bicron microrem meter indicated 3.5 mrem/hr at the gate, 0.05 mrem/hr on the wall inside the lab area and 0.01 mrem/hr on the shield wall in the tunnel.

The levels at the gate exceeded the predicted value of 0.24 mrem/hr. The model used to predict the scatter at the exit was for a highly collimated x-ray beam. The difference in source geometry accounts for the disagreement. The vicinity of the labyrinth will be posted as a Controlled Area with RF Power on.

Attachment

cc: R. Connonly
J. Durnan
S. Ellerd
A. Etkin
A. Ratti
K. Reece
J. Rose
RSC File (M. Heimerle)

RADIOLOGICAL SURVEY FORM

REASON FOR SURVEY: [ ] ROUTINE [X] SPECIAL [ ] RWP #:

BLDG #: 1004 LOCATION: RF TEST AREA DATE/TIME: 6/27/95 0900

INSTRUMENT MODEL/SERIAL #: BICRON MICRO-REM A8763

RADIATION (HIGHEST)	
CONTACT	3.5 MR/HR
GENERAL AREA	1.5 MR/HR

AIRBORNE △		
TIME	uCi/cc	% DAC
~	NA	~

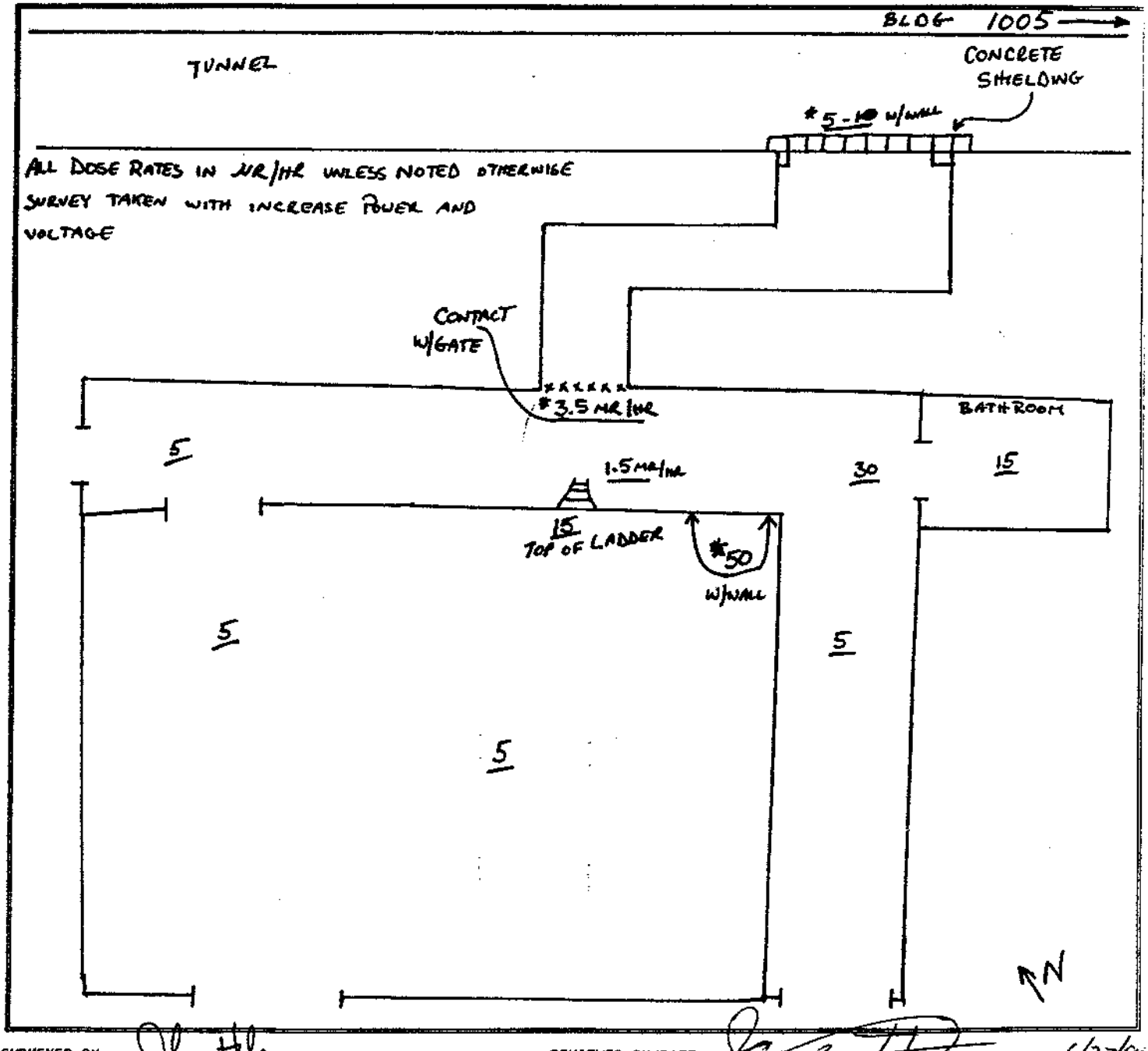
LEGEND: ○ Smear Survey Results; □ Masslinn Survey Results; XXX = Contact Reading; Y = Radiation Type; ZZZ = Reading @ 12"

SMEAR SURVEY RESULTS (DPM/100 CM²) ^{3}H β-Y α (Circle one)

1.	8.	15.
2.	9.	16.
3.	10.	17.
4. A	11. A	18. A
5.	12.	19.
6. N	13. N	20. N
7.	14.	21.

MASSLINN SURVEY RESULTS (IN DPM)

1.	8.
2.	9.
3.	10.
4. A	11. A
5.	12.
6. N	13. N
7.	14.



VOTE: ALL DOSE RATES IN MR/HR UNLESS NOTED OTHERWISE
SURVEY TAKEN WITH INCREASE POWER AND VOLTAGE

SURVEYED BY: John Hill

REVIEWED BY/DATE: James L. Norman 6/27/95

Form 055-1000.1

File Code: HP3120

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BROOKHAVEN NATIONAL LABORATORY

RHIC Project

M E M O R A N D U M

DATE: August 8, 1995

TO: J. Rose

FROM: S. Musolino SM

SUBJECT: Measurements of Prompt Radiation from the PoP RF Cavity Test Stand in Building 1005 Highbay

Measurements at steady state high power were made on June 21 and 27, 1995 to confirm the source term used to design shielding and interlock protection for the test enclosure. During the measurements, the cavity gap voltage was held at 300 kV and 100% duty factor corresponding to 44 kW of dissipated power . Direct measurements at the cavity were made with a Chipmunk by integrating the digital output with a multichannel scaler.

The Chipmunk output was determined to produce approximately 1100 counts/4.18 seconds at 5.5 feet from the cavity, with the quality factor set to one. The raw data converts to 2.37 rad/hr. Since actual source geometry was not determinable, it is appropriate to express a range of dose rate at one foot. If a geometry between a $1/r$ and a $1/r^2$ is assumed, then the cavity will produce 13-99 rad/hr at one foot. Even though the geometry is not a point source, the worst case extrapolation complies with the Class III area that has been configured for operation.

The leakage through the wall at zero degrees at the source was over a factor of ten below the prediction.

Attachment

cc: R. Connolly
J. Durnan
S. Ellerd
A. Etkin
A. Ratti
K. Reece
J. Rose
RSC File (M. Heimerle)

RADIOLOGICAL SURVEY FORM

REASON FOR SURVEY: [ ] ROUTINE [X] SPECIAL [ ] RWP #

BLDG #: 1005 LOCATION: RF AREA DATE/TIME: 7/21/95 1500

INSTRUMENT MODEL/SERIAL #: BICRON A876S

RADIATION (HIGHEST)	
CONTACT	2 MR/HR
GENERAL AREA	1 MR/HR

AIRBORNE △		
TIME	uCi/cc	% DAC
	NA	

LEGEND: ○ Smear Survey Results; □ Masslinn Survey Results; XXX = Contact Reading; XXX / ZZZ: Y = Radiation Type, ZZZ = Reading @ 12"

SMEAR SURVEY RESULTS (DPM/100 CM²) ³H β-Y α (Circle one)

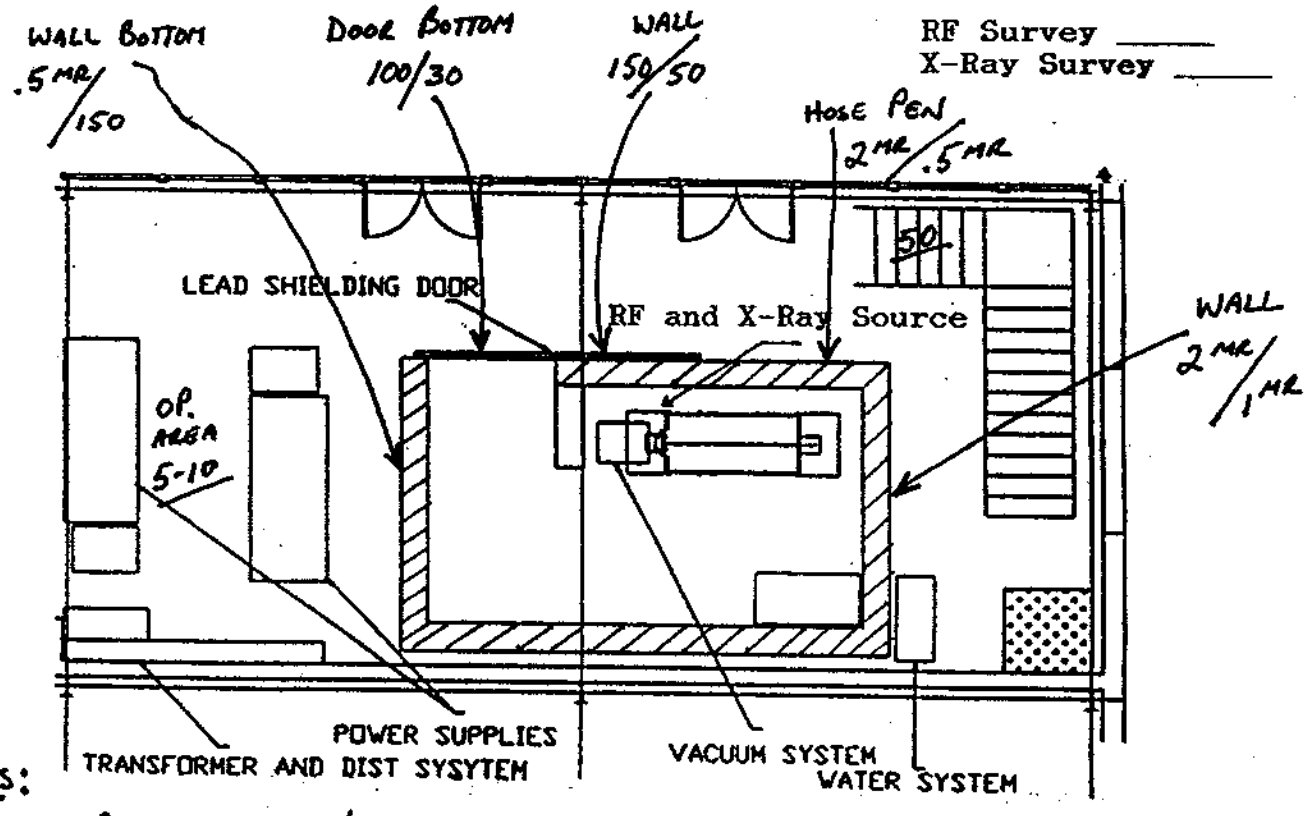
1.	8.	15.
2.	9.	16.
3.	10.	17.
4.	11.	18.
5.	12.	19.
6.	13.	20.
7.	14.	21.

MASSLINN SURVEY RESULTS (IN DPM)

1.	8.
2.	9.
3.	10.
4.	11.
5.	12.
6.	13.
7.	14.

SURVEY TAKE WITH RF CAVITY RUNNING @ 260 K VOLTS

Building 1005 RF Test Stand



NOTES:

ALL DOSE RATES IN MR/HR UNLESS OTHERWISE NOTED

CONTACT/30 CM

DOSE RATES ON ROOF: 2 MR/HR / 1 MR/HR

SURVEYED BY: John Hill

REVIEWED BY/DATE: James T. Harman 7/31/95